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Journal of the Society of Arts.

FRIDAY, DECEMBER 24, 1858.

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NOTICE TO INSTITUTIONS.

The following letters have been addressed to the Secretaries of the Institutions in Union with the Society :—

Society for the Encouragement of Arts, Manufactures, and Commerce, Adelphi, London, W.C.,
17th December, 1858.

Sir,—The terms on which the Institutions are admitted into Union with this Society have recently been under the consideration of the Council, with a view to ascertain whether such alterations could be made as would enable the smaller Institutions to avail themselves at least of the advantages of the Society's Examinations, if not also of all the benefits of the Union.

Having considered all the suggestions and returns which have been received from the Institutions, the Council concluded that the best mode of dealing with the subject at the present time would be to pass the following resolution, which was unanimously agreed to, viz., " That at the Examinations of 1859, the Provincial Unions in Union with the Society of Arts may have the privilege of introducing Candidates belonging to smaller Institutes in Union with such Provincial Unions, but not in direct Union with the Society of Arts, provided that a fee of two shillings and sixpence be paid to the Society of Arts by the Provincial Union in respect of each candidate so admitted, and that the privilege be not exercised in favour of any Institute that has more than 50 members, or an annual income of more than £50."

Under this resolution, no small Institution in any Provincial Union connected with the Society need be excluded in 1859 from the Society's Final Examinations.

Wherever such a Provincial Union exists, the small Institutions can join it. Where no such Union exists, the Institutions, large and small, are recommended to form themselves into a Union, and to connect it with the Society of Arts. The Society has always recommended the Institutions in Union with the Society to group themselves also into smaller Local Unions, for the purposes of mutual co-operation, which is important for their welfare and efficiency. I am, Sir,
Your obedient Servant,
P. LE NEVE FOSTER, Secretary.

Society for the Encouragement of Arts, Manufactures, and Commerce, Adelphi, London, W.C.
20th December, 1858.

Sir,—I have sent by this post a copy of the Programme of the Society's Examinations for 1859, in which is embodied the recent resolution of the Council in reference to the admission of Candidates from the smaller Institutes, of which I informed you in my letter of the 17th instant.

The Council would be glad to be informed what number of candidates you think it probable may come up for Examination in 1859, and whether satisfactory arrangements are made for the appointment and action of a Local Board of Examiners.

It is important that, while the Local Boards are not unnecessarily multiplied in any locality, one should be formed within easy distance of every Institute that has Candidates for Examination.

The Council will be obliged if you will furnish me, as soon as possible, with the names and addresses of the members of your Local Board, and with a statement of its title and locality. It is important that the Christian and surname, and exact address, of the Secretary of the Board, together with information whether it is to act for any other Institute besides your own, should be supplied.
I am, Sir, your obedient Servant,
P. LE NEVE FOSTER, Secretary.

A copy of the Programme of the Society's Examinations accompanied the foregoing letter.

The Committee of the Society for the Diffusion of Pure Literature have granted to the Council of the Society of Arts the privilege of giving recommendations to the Institutions in Union, enabling them to obtain at half-price libraries of £5 worth and upwards of books, to be selected from a catalogue issued by the Society, and which will be supplied to any Institution applying for it. The principal objects of the Society are to promote the circulation of such books, periodicals, prints, diagrams, and other publications as the Committee may, from time to time, deem really useful and good, whether they are issued by individuals or by Societies.

Institutions desiring to avail themselves of this privilege, should communicate with the Secretary of the Society of Arts.

SIXTH ORDINARY MEETING.

Wednesday, Dec. 22, 1858.

The Sixth Ordinary Meeting of the One Hundred and Fifth Session, was held on Wednesday, the 22nd inst., Thomas Clegg, Esq., of Manchester, in the chair.

The following candidates were balloted for and duly elected members of the Society :—

Bower, Arthur Perry
Hacket, Charles A.
Mollett, John
Phillips, John Arthur

The Paper read was—

THE CULTURE AND PREPARATION OF COTTON IN THE UNITED STATES OF AMERICA, &c.

By Leonard Wray.

Statistics inform us that the annual consumption of cotton in Great Britain amounts to about 2,300,000 bales, weighing in all 920,000,000 lbs.

This vast quantity of the raw material keeps our numerous cotton manufactories in the proud and enviable position which they occupy, giving employment to so large a proportion of our population, furnishing cargoes to the merchant shipping of the world, and rendering almost every country on earth tributary to the industry, skill, and enterprise of our British " cotton lords" and their admirable artizans.

A great national industry, such as this, creates not unnaturally, unbounded jealousy in rival nations towards our country ; whilst amongst ourselves, there is undoubtedly an increasing anxiety lest from any cause an adequate supply of this important staple product should not be obtainable. The bare possibility of this supply being suddenly cut off, and our cotton manufactories being thereby stopped, is indeed sufficient to create the most anxious alarm in every thinking man's mind in the United Kingdom.

Our cotton reports show that our own territories furnish us with only about one-eighth of the quantity employed by our manufacturers, whilst seven-eighths are supplied by the United States of America. Could we feel certain that no circumstances can ever arise to interrupt this vast supply from America, this country might, to a certain extent, be excused for viewing the subject with indifference, but common sense, and the experience of all time, unhappily forbid our entertaining a confidence for which we have so slight a warrant.

To say the least of it, even the bare probability of such an event constitutes a perpetual menace to this country, and imperatively demands a remedy and a safeguard. Fortunately, men of the right stamp are daily becoming more and more alive to the vital importance of this subject, and are bestirring themselves to render the supply of cotton to our factories more dependent upon our own exertions, and less upon the necessities or goodwill of our friends and cousins in the New World.

The course which is the most obvious, and which is indeed the only one we can reasonably pursue, is that now entered upon by these Manchester gentlemen, viz., the encouragement of cotton culture in the numerous colonial possessions of Britain—in the negro territories on the west coast of Africa—and in other suitable localities.

The production of cotton in the British possessions has been confined almost wholly to India; and that it admits of enormous extension in that noble country, everyone acquainted with the subject must be fully aware; but attention has also been forcibly attracted to the peculiar capabilities of our Australian, African, and other colonies, for the production of the same article; and every exertion will no doubt be made to obtain a certain supply from these sources.

The cultivation of cotton, however, is something quite new to the British colonist, and, indeed, I may say to the British nation altogether, inasmuch as the English have never yet seriously engaged in this important culture.

Hence we find in this country the greatest possible ignorance existing respecting the different kinds of cotton, the modes of cultivation, and its preparation for market. If we go outside the circle of cotton brokers, and make an inquiry on any of these points, we are told that absolutely nothing practical on the subject is generally known, but that we are sure to find something about it in some of the large encyclopædias.

Now, to any man who may meditate entering on this culture, or to any body of men who may desire to induce others to attempt this enterprise, such want of really practical information is a very great and serious obstacle, one which effectually frightens both the capitalist and the colonial planter. In the commencement of last year, I paid a visit to the United States, and became the guest of one of the great cotton planters in South Carolina, where I had the opportunity of seeing the methods pursued, both in that State and in Georgia, from the sowing of the seed to the pressing of the bales by steam power, prior to their shipment for New York, and for England.

I had seen cotton cultivated in India, and an attempt at cultivation in the colony of Natal; but here I was in the very heart of the cotton region of America, and I resolved to become master of the whole subject, in order that I might, at some future time, make my observations useful to the interests of my own country.

As an agriculturist myself, I was well aware, that to understand the subject thoroughly in all its bearings, it was necessary to study closely the whole question of labour; *id est*—slave labour as compared with the free labour, such as England commands in her various colonies. A fair comparison of these opposing conditions affords us a clearer conception of the chances which each system will have in the great struggle about to take place between them. Quite apart from the questions of climate, soil, and seasons, is that of labour; and it is one deserving the most attentive consideration, for on it mainly depends the pecuniary success of any attempt to grow cotton for the markets of the world.

My observations on all these points I will now endeavour to lay before the Society, hoping that they may prove interesting and useful to the country at large.

When we speak of the culture of cotton, it is necessary to understand most clearly, first of all, the great difference which exists between the long staple, or Sea Island cotton, and that known as short staple, or up-land Georgia; the former ranging in price from 10d. up to 5s. per lb.: whilst the latter commands only from 3d. to 10d. per lb., (these being the extreme ranges of price in the two descriptions of cotton): and secondly, the important fact that the cotton plant yields, besides its lint, other valuable products; viz., a pure, bland oil, equal to that of the olive; an oil-cake most excellent for feeding stock, and a fibre from the bark of the plants, which may probably become of great importance.

As it is very desirable that these auxiliary products should be borne in mind, I have mentioned them thus early, for in all calculations of produce from a cotton plantation they seem to have been almost entirely ignored hitherto, although I am not satisfied that, in many cases, they may not yield as large a money return to the planter as that from the cotton itself.

Even in the United States, which produces annually some 3,000,000 bales of cotton, it is very recently that the valuable character of the seeds has been partially turned to profitable account; hence we find that very very few planters have yet availed themselves of the pecuniary advantages derivable from this source.

It is generally calculated that short staple, or up-land cotton, yields from two to three pounds of seed to each pound of ginned cotton, or lint, whereas, long staple cotton gives a much greater proportion of seed. In the rich lands of Alabama, Mississippi, Louisiana, &c., the short staple seldom gives, on an average, less than three pounds to the pound of lint.

I ask particular attention to the following account, published in New Orleans last year, by Dr. Jenner Coxe, shewing that an increased value of more than £7,600,000 Sterling might be given to the cotton crop of the United States by utilizing the cotton seed, which is now almost wholly wasted.

The statement is by Mr. Woodall, confirmed by Mr. W. P. Converse and by Dr. Coxe himself.

"Average cotton crop of the United States three million bales, at 400lbs. per bale, will be of ginned cotton 1,200,000,000lbs. To each lb. of cotton there are 3lbs of seed,—3,600,000,000lbs.; retained for re-sowing, including waste, &c., 1,800,000,000lbs.; leaving, for making oil, oil-cake, and soap, 1,800,000,000lbs. 100 lbs. of cotton seed will yield two gallons of oil, equal to that of Italy termed "Salad oil;" and it sells in New Orleans at 4s. per gallon, whilst in New York it fetches 6s. per gallon); 48 lbs. of oil-cake, (equal or superior to linseed cake,) and 6¼lbs. of soap stock, which, with ingredients of small value, will make 20lbs. of soap equal to the best European kinds."

The following, then, is a moderate estimate:—

36,000,000 gallons of fine oil at 75 cents......	£5,400,000
864.000,000 lbs. of oil-cake at 1 cent	1,728,000
106,000,000 lbs. of soap stock at 3 cents	636,000
Total estimated value	£7,764,000
Or, allowing a deduction of one-third to satisfy all objections	2,588,000
Leaving a gross amount of	£5,176,000

It will be remarked that in this statement the value of the fibre obtainable from the bark of the plant itself has not even been mentioned, although, from the rough specimen which I hold in my hand, some opinion may be formed of the importance which this product may hereafter attain, seeing tnat there are certainly seven millions of acres now under cotton culture alone in the United States.

I think this brief allusion to these auxiliary products is sufficient to show that they should by no means be overlooked in estimating the returns from a cotton plantation in America or elsewhere.

The Culture and Preparation of Upland Cotton.

The American planter always prepares his land with the small plough usually drawn by one or two mules or horses, which are trained to walk very fast. The person holding the plough, being either a negro man, woman, or boy, who generally works the same animals every day, is responsible for their treatment, and teaches them to behave in the most docile and intelligent manner, whilst they themselves become exceedingly expert as ploughmen (or women as the case may be).

In many cases, in fact, I may say in the vast majority of cases, where the planter has to deal with poor soil, he infinitely prefers employing his land every other year, or every third year, rather than going to the trouble and expense of manuring it, nor does he, except in rare instances, take the least care of the fields lying fallow, consequently they generally present a picture of the utmost untidiness and neglect, covered with weeds, amongst which a few cattle strive to obtain a scanty picking.

The preparation of the lands commences in November, and continues until March and April, when the sowings take place.

The land having been ploughed and harrowed down, is then again ploughed and thrown into ridges or beds, from 2 to 2½ feet broad, the tops being neatly levelled or smoothed by a one horse implement termed a sweep.

The sowings are made as early in the season as the frosts will allow, in order to get all the land planted in good time, and to have the crop in as forward a state as possible. In this, however, there is always more or less risk, for late spring frosts may come and all the young plants may be cut off in a single night, entailing the necessity of resowing the whole of the fields. Thus, last year many planters in South Carolina, Georgia, and other states, had to re-sow as late as May. So very tender is the young cotton plant.

The manner of sowing the seed varies according to soil and locality, or according to the peculiar ideas of the planter; thus the distance of the rows, from centre to centre, ranges from three feet to four-and-a-half feet; whilst some deposit the seed in furrows opened by a light plough, and others carefully dibble in their seed at exact distances apart. This latter method is practised on the estate of my friend, the ex-Governor of South Carolina, where I chiefly resided, and this mode I will therefore more particularly describe, as he speaks in high terms of its superiority.

The beds having been formed, as above noticed, a gang of men (taking each a row) proceed rapidly along, striking their dibbles (so called) into the centre of the beds, at exact distances of 12 inches apart. A second gang (generally women) deposit five or six seeds in each hole or indentation made by the dibbles, and a third gang (generally young boys and girls) follow with light hoes and cover the seed with soil, thus completing the operation.

This may seem to many a very roundabout method of accomplishing this apparently simple matter, but it must be remembered that upland seeds are not only furred by the cotton lint still remaining on them, but they stick so together that their delivery, even by the most ingenious drilling machine, is held to be very uncertain and unsatisfactory. Moreover I can say, from actual experience, that the rapidity with which these trained negroes get through the work is something truly astonishing, and only to be appreciated by those who thoroughly understand such operations.

The seed being sown, the greatest possible care is taken to prevent the growth of weeds, for if these once get the upper hand, the crop is either seriously injured, or entirely destroyed; hence this is a pretty hard time for the negro labourers, who with light and sharp hoes, have to do unceasing battle with the enemy until the young plants have reached a certain size and strength. These weeding gangs also from time to time cut out the weakly plants, until at length only two, and these the strongest are left in each hole. Supplying, or re-sowing the holes that have failed to produce plants, likewise occupies attention.

It is always the object of the planter to perform as much of his work as possible by means of his horses, mules, ploughs, sweeps, &c., and as little as he can by mere hand labor; but the weeding of the very young and tender plants is an operation too delicate to be performed with any safety or nicety altogether by ploughs or sweeps; although I believe some "very smart" planters do occasionally boast that they never use such a thing as a hoe in their cotton-fields.

It is an undoubted fact, which I unhesitatingly vouch for, that the negroes in the Southern States are altogether unequalled in horse or mule husbandry; and I assert that the rapidity, efficiency, and the precision of their work, is infinitely beyond anything that is dreamed of in this country:—but we must well understand, that this excellence in work arises from the *unceasing training of a life-time*, under the watchful eye of those whose lessons are very sharp and striking, and who will listen to no excuses. They must work well, and they do.

It is usual in the States to calculate the crop at so many acres to the working "hand," (as the slave is denominated); thus a cotton planter with 50 good working hands (great and small) and 25 mules, would consider his strength equal to 500 acres of cotton, and 400 acres of corn, or to 1000 acres of cotton alone, provided extra hands were allowed to help in picking in the crop. This is the general mode and rate of calculation, where the soil yields about 200lbs. of ginned cotton to the acre; making therefore to the hand, 2000lbs. of cotton, which at 5d. per lb. on the spot, is worth about £40 sterling, besides the value of the Indian corn raised.

The whole cultivation of the cotton plant, up to the period of its first "picking," is termed "making the crop," therefore a planter will say "my crop is made, so that part of the business is over."

It must not, however, be supposed that crops arrive at this stage without very frequently encountering many and serious trials; on the contrary, the cotton plant has many enemies, such as the cut-worm, the army-worm, grasshoppers, &c., &c., whilst too much rain, or a long-continued drought, does it great injury; and certain moths deposit their eggs in the very young and tender bolls, which are thereby partially or wholly destroyed, and this sometimes occurs to an immense extent.

If the season has been forward and favourable, the "picking" may begin in August; but if backward, the first general picking may be delayed until September. In uncommon cases, in some districts it may begin as early as July; but whenever it does commence, the chief dread of the planter is an early frost; for until a killing frost does occur, the plants continue to produce and ripen their bolls.

During the picking season, as may be supposed, the utmost activity prevails, every available "hand" goes to the field; and the shorter the individual the less will his or her back be tried, for cotton picking generally is rather a back-aching employment.

Each picker takes a bag (tied round the breast or waist) and a good sized cotton sheet; the former he fills with the cotton he picks, which he then lays out on the latter to dry, whilst he is re-filling his bag, and so on until his sheet will hold no more, when he carries it to the weighing house, and returns for another lot.

A good careful hand will pick in a fair field 200lbs. of seed cotton in a day; but to accomplish this quantity, he or she must be a "right good hand," unless the cotton is unusually thick on the bushes. I have, however, heard it frequently affirmed, that in the teeming valley of the Missisippi, the hand not uncommonly picks from 400 to 500lbs. a day, but it must be killing work, and the cotton so picked must be very foul.

Successive pickings, each being less in quantity, at length so exhaust the cotton on the bushes, that there is no longer any left to pay for further picking; the cattle are then turned in and speedily destroy the bushes, and the land is left in this condition until required some succeeding year either for corn or cotton again.

In the valley of the Mississippi, the common average yield per acre of ginned cotton is one bale of 400lbs., whereas in South Carolina, Georgia, &c., 200lbs. is considered a very excellent return per acre, much of the land not giving even 100lbs. per acre.

There is, however, abundance of rich land in all these states, which will yield 400 lbs. to the acre; but being low lying, the cotton is liable to mildew, to be injured by wet, and to be killed by early frosts; whilst, at the same time, they are very unhealthy; hence such lands are preferred for corn and rice.

Some upland cotton plants, under favourable circumstances, are wonderfully prolific, producing from 300 to 400 bolls per tree, weighing 4½ lbs. of seed cotton, equal to about 1¼ lb. of ginned cotton. Indeed, intelligence has just reached me from the southern states that a planter at Oxford, in Georgia, has, by judicious management of his seed, succeeded this year in obtaining a plant which, although only 4½ feet high, ripened 420 bolls, yielding nearly 5 lbs. of seed cotton. From this it may be imagined how very greatly the produce per acre may be increased by a good selection of seed, and by a careful attention to the due preparation and manuring of the land, instead of having a large straggling cultivation, unmanured, and miserably neglected.

Picking cotton is no doubt considered by many to be a very easy and simple operation, but, in reality, to pick cotton properly is a very nice and delicate business, inasmuch as it is essential to withdraw every particle of cotton from the boll at one pull, without getting any leaf, scraps of leaves, or other foreign matter clinging to it. By dexterous management, so as to grasp lightly with the fingers the five sections comprising the boll, and withdraw at once all the cotton in it, the rapidity of the picking is insured; whereas, by making two, three, or four efforts, but a small quantity would be gathered in the day's work, and the unskilful hand would cut but a very sorry figure at the weighing house in the evening. By obtaining it free from small fragments of leaves and of the boll itself, the cotton is clean, and consequently entails little or no trouble in getting rid of these extraneous matters prior to being ginned.

Great rapidity and care are therefore qualities essential to form a good cotton picker, and the strictest supervision is exercised in enforcing them. Apart from all this, however, the pickers very frequently get sore hands in the picking season.

But the most annoying and distressing circumstance under which the "hands" labour, is the wetness of the bushes in the cold autumn mornings, caused by heavy dews at night. This wets the people's clothes, and often leads to colds, influenza, rheumatism, &c., which recently some planters have sought to remedy by providing waterproof aprons or skirts to be worn by the hands.

Wherever the strength of the estate will allow it, the hands are put to other occupations in the morning, until the sun has partially evaporated the moisture on the bushes and on the cotton, when they commence picking; but in the cold frosty mornings the sun only thaws the moisture, and the pickers generally get both wet and cold. There are numerous plantations, however, so pressed for time that the hands are kept at it dew or no dew; although the planter by no means likes it, for the cotton picked is in a very damp state, subjecting it to great deterioration; whilst the hands run great risk of sickness and death.

A comparatively dry season, with only a few showers now and then, is that most favourable for cotton picking, and that for which the planters most earnestly long.

Immediately a sufficient quantity has been picked and ginned, it is packed in bales (under considerable pressure) and sent into town, the planter being only too anxious to convert the first of his produce into money; thus, from the month of August, waggons are constantly on the road, loaded with the standard "currency" of the south, and, by November the crop should be all baled and sent to market, where, in general, it is sure to meet with a ready sale.

This facility of sale is the main reason for the planters clinging so tenaciously to the cultivation of cotton, for they always feel that, with a few bales of cotton in hand, they can obtain money at any moment by making the very smallest possible sacrifice, or perhaps without any sacrifice whatever.

Besides this, the culture is so well-understood by their hands, and the preparation of the cotton for market is so exceedingly simple. Indeed, this preparation consists merely in passing the seed cotton through the ginning machine to separate the seeds, and then pressing the lint into bales of about 400 lbs. each.

Two machines (costing each from £16 to £22) will gin a crop of from 300 to 500 bales, and the screw press, which costs only £30 to £50 when made on the plantation, is able to compress 30 bales a day.

I have spoken of short staple, or upland cotton, but it must be understood that there are endless varieties (so-termed) of short staple cotton, which it would be tedious and out of place for me to speak further of here; suffice it to say, that it is on the sea islands and sea-coasts alone that the long staple can be advantageously grown, whilst the short staple has the whole range of the vast interior of all the Southern States of the Union.

Before quitting the subject of short staple cotton, I wish to mention a particular description, which is grown in the island of Cuba, where it is chiefly used for making the wicks of lamps on sugar estates—being of a very coarse and inferior quality. The pods or bolls are, as will be seen from the specimen now in my hand, of enormous size; the plants grow into considerable-sized trees, attaining, very generally, a great age, and are remarkably prolific. I regard the cotton more in the light of a curiosity, for I do not, at present, see that any great commercial value can be attached to it, although we do not yet know what effect might be produced by crossing it with a finer description of the cotton plant.

Long Staple Cotton.

The long staple cotton which fell under my observation in the United States, is that commonly known as "sea island," from being generally grown on a multitude of small islands on the sea-coasts of South Carolina and Georgia; but now it is, I believe, extensively cultivated in Florida, Louisiana, and Texas also.

Removed any distance from the coast-line, this cotton, I am told, immediately degenerates, and becomes short in its staple and wretchedly poor in its yield; hence we may consider its only congenial locality as being the very shores of the sea.

The chief sea island region of South Carolina lies between Charleston and the great Savannah river, which separates that state from Georgia; and of this region, the island of Edisto has the reputation of producing the finest and most valuable.

The very small specimen now in my hand, was given me as being part of a bale the production of that island, which sold for one dollar and a quarter (rather more than five shillings) per lb. to a French buyer, for the purpose of being worked up into lace in France, and I heard of a small sample being at that time in Charleston which was valued by the best judges at one dollar and a half (more than six shillings) per lb.; but this was said to have been grown in Algeria from American seed.

It must be understood, however, that these prices, in America, are considered extremely high, and of most unusual occurrence, the more usual qualities and prices being much lower. Such extraordinary prices as these are scarcely to be wondered at, when we know that one lb. of this fine cotton has been spun into thread, 1,000 miles in length, which, when made into lace, has sold for upwards of £250.

I shall now proceed to touch on the culture and preparation as pursued on the sea islands.

The preparation of the land and the throwing up of the beds for the plants, very much depends upon the peculiar situation of the fields and the nature of the soil. The land may lie low and be very much impregnated with salt, from the occasional influx of a very high tide, or it may be somewhat swampy from a superabundance of fresh water; again, it may be a very light and sandy soil, or it may be a pretty stiff clay, or, varying from all these, it may be a nice warm loam, lying high and dry, above the influence either of tides or of freshets. According as these conditions vary, so, to a certain extent, does the practise of the planter. In low-lying lands, very light drainage alone is practicable, hence, when they are of a clay soil, they are liable to be, at all times, cold and trying to the plants, keeping them sickly in appearance and backward in their growth. In such cases it is usual to ridge very high, to plant thin or wide apart, and to give the warmest manures available. The spaces between the ridges act as so many superficial drains to carry off the superfluous water to the main drains. These ridges are mostly thrown up in the first place by means of suitable ploughs, and finished off by the hoe; and indeed, throughout the whole culture or "making of the crop," there is a great deal more hand-labour than there is on the upland plantations, and infinitely more care bestowed. On higher lying and drier lands, such heavy ridging is not required, although I remarked that the system of ridging is, to a certain extent, universal on all the Sea Island plantations.

In all their operations, horse or mule labour is always availed of, as far as possible, in order to abridge hand labour; but the very nature of this cultivation necessitates a recurrence to the human hand, to so great an extent as to limit very materially the quantity of land sown every year by each planter. The produce is so much more valuable than upland cotton, that 200 acres of the one, properly cultivated, will, on an average, represent in money value 1000 acres of the other, consequently, the sea-island planter can afford more time and more expensive labour than his brethren of the interior.

Notwithstanding this, there is not that amount of good and scientific cultivation apparent on these plantations generally, which, from the valuable description of the produce, a fastidious Englishman would expect to find. There can be no question that the fields planted in cotton are very clean and very carefully kept; but those lying fallow are covered with a profusion of tall weeds and troublesome grasses, which shed their seeds, and having impoverished the soil, leave behind them a legacy of labour and vexation to the planter.

I was so struck by this seeming folly, that I inquired of one of these gentlemen why he did not "green soil" these lands, instead of abandoning them to weeds and desolation. His answer was eminently characteristic of the state of feeling and state of things there existing. "It is very well for strangers to ask such questions, and to wonder that they do not see amongst us that high class condition of agriculture which is to be found in the north, and in England; but remember, my dear sir, that we, too, have our experiences, for which many of us have paid pretty dearly. Most of us have been established here upwards of 100 years, and have from time to time tried manuring, green soiling, clean fallows, and all the other methods pursued and recommended in England, but we have always found that with the soil and climate we have, and our negro labour, we succeed better by keeping to the system which seems so unthrifty to you. Besides, we have not sufficient labour, nor mules to plough up more land than we absolutely require each year to plant in cotton, corn, and sweet potatoes; so we content ourselves with giving to our land such manure as we can make and collect ourselves, and are only too happy at knowing that we are on the right side of the hedge, and not getting into debt and difficulties."

The experience of many years in various countries has taught me the presumption of despising any local practices which for many long years have proved successful, however opposed such practices may be to all my own ideas; still I think that, were I a Sea-island cotton planter, I should try what might be accomplished by a change of system.

Great numbers of these island plantations have large stores of manure, in the shape of rotten reeds, flags, marsh, grass, &c., brought to their very fields by numerous intersecting rivers, creeks, &c., besides the quantities of rich, saline mud, intermingled with small shells, which they likewise furnish. Most planters avail themselves largely of this bounteous supply, and thereby add very greatly to the fertility of their lands, and of course to their return per acre. I was much astonished at the very saline character of the soil in which I saw much of this cotton thriving; and I think it quite worthy of note, that I saw in many places large tracts of land, which had, perhaps, but a year or two previously been quite covered by the salt water of one or more high tides, and which still retained so much saline matter as to be apparent even to the eye, but which were nevertheless covered with the most luxuriant growth of bearing cotton. I also saw other tracts quite denuded of all vegetation, save a few saline plants, and which appeared to be little better than a salt marsh, but to my surprise I learned that in a couple of years they, too, would be growing just as fine cotton as much that I had seen. I must confess I had no previous conception that this valuable cotton would even grow at all on such highly saline soils; and had I not seen it myself, I should have been somewhat incredulous of the fact. As it is, I do from actual experience vouch for it as undeniably true.

I cannot see any difficulty in sowing this description of cotton seed by means of a drilling machine, for the seeds are perfectly smooth, and consequently easy of delivery; in fact, many plantations always employ a machine, called a "cotton planter," which dispenses with the number of hands usually employed in dibbling on Upland plantations.

The sowings being effected, all the after operations in the field, such as weeding, moulding, banking, or ridging, are successively performed, entailing, as I before remarked, no inconsiderable amount of hand labour.

About July or August the picking commences, and continues until November generally, unless severe frosts occur earlier.

If rapidity and care are imperatively required in picking the short staple variety, it can well be imagined that extreme care and attention are demanded in gathering in the delicate and valuable "sea island." Rapidity of work is by no means so essential as great cleanness, for the object is to preserve the quality, and thereby maintain the established reputation of the particular plantation. Upon this reputation depends not only the price, but the very sale of the cotton, for it must be understood that this description of cotton, being employed only for particular purposes, does not meet, by any means, so ready a sale as the short staple; indeed, not unfrequently a planter cannot sell his crop at all, and is obliged to ship it to England at all risks.

Its picking, and every step in its preparation for market, receive, therefore, the utmost care and attention.

When it has been picked, the first object is to get rid of any superfluous moisture it may contain without drying it too much. It is then picked over, to get rid of all motes, and discoloured particles of cotton, which sometimes, from insects boring into the bolls, and from other causes, get mixed up with the mass.

This being satisfactorily performed, it is kept in heaps sometimes five feet high, four to five feet broad, and twenty feet long, and covered over with cloths. The object of this is to preserve the oiliness, strength and gloss of the fibre (which a lengthened exposure to the air would destroy), until an opportunity offers of selling it, or it is necessary to send it to market. But by thus keeping it in heaps, the liability to heat must be attentively watched and guarded against, for whenever it gets too warm, the heaps must be immediately opened out, and the cotton be carefully spread on the clean-swept floor of the cotton house, to be again replaced in heaps as soon as it has become perfectly cool. If the heaps become hot, in a very brief space of time the oil contained in the seeds oozes out on the fibre, and imparts to it a dirty yellow colour, which rapidly changes into a brown, and thus destroys its commercial value: but many planters do not object to its becoming very slightly heated, esteeming it an advantage rather than otherwise, inasmuch as they consider that the fibre extracts gradually some of the oil from the seeds, and thereby becomes stronger, softer, and more silky, whilst at the same time it acquires a very delicate shade of yellow, such as experienced buyers admire.

But the time has now arrived for separating the fibre from the seed, and here we become aware of a very remarkable fact—one which completely astonished me. I found that the machine chiefly used for this purpose was no other than the little, humble, and despised roller gin of India—the veritable *churka.*

This little implement consists of two wooden rollers, of about 8 to 9 inches long and one inch in diameter, placed horizontally and in contact, one above the other, and revolving together, drawing the fibre of the cotton through and leaving the seed behind. In Carolina the motion is communicated by a treddle, worked by the foot, whilst the feeding is by hand as in India.

By means of this little machine 12lbs. to 20lbs. of cotton are prepared in a day, and that is considered fair work; but my scientific and esteemed friend, Mr. Robert Chisolm, of Coosaw plantation, has applied steam power to give motion to all his roller-gins, or *churkas*, and this gets through a very great deal more work per hand daily.

So exceedingly sensitive however is the market for this peculiar description of cotton, and so cautious are the planters, that those who grow the very finest kinds will on no consideration deviate from the beaten track, nor employ any other machine than the little, simple, old-fashion churka, actuated by the treddle.

These gentlemen maintain that the rapid motion given by steam, not only heats the fibre, but strains and even breaks it.

This assertion Mr. Chisolm, on the other hand, utterly denies, and instances his own large crop, which always maintains the current prices. There is, however, another, and a totally different machine (known as "McCarthy's"), which is now coming into very extensive use amongst the growers of second and third-class Sea Island. One extensive planter (who has on his plantation eight of them worked by steam-power) told me that his cotton fetches the same price now that it did when he used the churkas, and so great is the advantage derived from their use, that he would rather abandon cotton cultivation altogether than go back to the use of the little fiddling roller-gins or churkas.

I must say that such an opinion, so emphatically expressed by a large planter of great experience, and perfectly disinterested, had very great weight in my mind, and I was pleased to find this opinion extensively confirmed afterwards. I have moreover heard gentlemen assert that they have prepared samples of the same quality by the roller-gin and some by McCarthy's machine, and then submitted them to all the first-class brokers in Charleston, none of whom could tell which was by the former, or which was by the latter; and this experiment they told me they had tried on the finest Edisto cottons with precisely the same result.

Now, I hold this to be important evidence for us in all our future operations, the more especially as one of these singular machines, steam driven, can turn out 500 lbs. of clean cotton per day. I have not ventured to speak of its performances in my own presence, for although I might do so as respects quantity, yet my eye is by far too inexperienced in this speciality to be a competent judge as to quality.

Machines precisely similar to these, but, I presume, smaller, are made in Manchester by Dunlop and Co., at from £7 to £10 each; whereas the large ones of South Carolina cost £20 to £24 each, including patent right; or £15 without the patent right.

There are several other kinds of machines in America for separating the seed from long staple cotton, all of which are very highly praised by their inventors, owners, and friends, but as I did not see them at work, and have no reliable evidence to offer respecting them, they must abide their time.

When the cotton has been cleared of its seeds, motes, and discolored particles, it is then pressed down very tightly into long round bags, quite different in form to the bales of Upland cotton; and it is never subjected to such great pressure as it would receive in a screw-press, for that would very seriously injure its fibre.

After his produce is all fairly bagged, the difficulties of the planter are not ended, but, as I said before, he has sometimes considerable trouble, and to wait a long time before he can find a buyer for it, and not unfrequently he has to ship it to Europe, and encounter all its manifold risks and chances.

This, indeed, constitutes the greatest disadvantage under which he labours. The Upland cotton planter makes his bale of cotton to-day, and to-morrow he has cash in hand for it; or perhaps he is even paid for it before it has left the trees: not so, however, with the Sea Island cotton planter, he is obliged to exercise all his patience before he can sell his crop, and in the meantime, although lord of 200 to 400 slaves and fine estates, he is very probably compelled to use his broker's name in obtaining cash from the banks wherewith to pay the current expenses of his estate.

It must strike every one as a singular feature in the banking system of Charleston, that a broker, who may be a mere man of straw, can get his bills cashed at the banks, whereas, those of a really substantial planter, owning large and most valuable properties would not be looked at; yet, such is the practice of these banks. I presume that there must be some good and sufficient reason for this, but I certainly failed in discovering it.

I have already stated that the Sea Island furnishes a larger proportion of seed then the Upland or Short Staple does; and I think we shall be correct in estimating it at four pounds of seed to one pound of fibre. These seeds are black, smooth, and clean, yielding a fine oil and excellent cake; whilst the bark of the plant furnishes a much better fibrous material than the Upland variety; this specimen being from a Sea Island plant.

It is necessary for me to remark also, that long staple cotton is not so prolific as the Upland varieties, consequently the quantity of cotton obtained from the acre is very much less.

200 lbs. of clean cotton seems to be the maximum, whilst some fields do not yield 40 lbs.; the hands therefore pick smaller quantities per day than on Upland plantations, and the picking seldom ceases until the trees are entirely stripped of their delicate and silken fibre.

Such, then, is Sea Island cotton planting; but I cannot take leave of these beautiful Sea Island plantations, without remarking upon the warm-hearted hospitality, unaffected kindness, nice sense of honour, and gentlemanly deportment of those proprietors with whom I had the pleasure of becoming acquainted during my visit to Beaufort and its neighbourhood in November 1857.

PROVISION CROPS.

The general rule on cotton plantations of all kinds, is to cultivate a certain quantity of Indian corn, rice, &c., for the food of the white people, the negroes, the mules, horses, horned cattle, and other stock belonging to the estate; but some planters grow very large quantities for sale also. A friend with whom I resided, in addition to his cotton crop of 275 bales, gathered in whilst I was with him 61,000 bushels of corn, of which he would use on his plantations, about 11,000 bushels, leaving 50,000 bushels for sale.

It must be understood that most planters allow 3 lbs. of bacon a week to each negro on the plantations, man, woman, and child, besides corn meal, molasses, tobacco, &c.; consequently it is not uncommon to kill and cure 400 to 500 hogs every year on a plantation having 300 to 400 hands all told.

I knew one planter with about 600 hogs, and the quantity of corn this herd of swine would dispose of was no small item at the end of the year, but all " this hog" was for the use of the plantation only, none being sold.

This brief explanation renders clear the practice of growing such large quantities of corn on most cotton plantations; but I may add, that from a variety of causes, many of them exhaust their stock, and have to purchase from their neighbours, who may have been more fortunate or more provident.

LABOUR.

Having thus touched on all the subjects most interesting in the culture and preparation of cotton, it is now essential that I should submit to the society my views on that great, and I must say, little understood, question, viz., that of labour, such as the slave gives his master on the cotton plantations, and that which can be calculated on by Englishmen from the free men to be found in the colonial possessions of Britain.

In doing this, I beg to remark, that I shall endeavour to consider the subject in a strict business point of view, feeling convinced that a really practical and scientific body of men must always prefer dealing with plain facts and figures.

The money-value of an individual slave can only be arrived at from a due consideration of his, or her, age, health, strength, freedom from blemishes, temper, capabilities, &c., &c.; but working hands, of all sorts, sizes, and ages, on a plantation, may be fairly estimated as being, on an average, worth 800 dollars, about £165 sterling, each person.

Considering the liability of loss by death, or disabling by accident, I do not think £16 per annum, as interest, will be considered unreasonably high. Add to this the cost of food, clothing, medical attendance, and small allowances, which on every well ordered plantation amount at least to 40 dollars, or about £8 per annum, and we find that the real cost of slave labour is about £24 per annum.

I will vouch for the general accuracy of this calculation. Let us then take this sum as the cost of slave labour, and next inquire what kind of labour it is that the planter obtains for his money? To comprehend this thoroughly we must consider that from childhood, the slave is constantly under the eye, not only of his master, but likewise under that of men of his own class, named "drivers" who are selected for their intelligence, their trustiness, and their thorough knowledge of plantation work; each day brings with it its lesson, which he must learn, and each year finds him improving in his work, and becoming more and more capable in the various duties assigned him.

His master's plantation is to him at once a home and an industrial school, in which the reins of government are held pretty tightly; into which he enters in early boyhood, and continues, ever learning, until old age, sickness, or death removes him.

It must be remembered that whatever occupation he may be put to, he is obliged to learn it thoroughly and to perform it well. That self-same stimulant which is sometimes so vigorously applied in our schools to brighten the faculties of our English boys, is also resorted to on plantations, but with more method and more severity. One of the primary lessons inculcated on the mind of a juvenile " hand" is, that if he does not perform his work properly he will be whipped; and when he has once mastered this lesson, and becomes positively certain that a good whipping will inevitably follow bad work, he has already gained an experienee which will save him from many flagellations. In short, he takes good care to avoid punishment if possible, and by so doing becomes a good and skilful labourer.

Now, this training goes on from day to day, and from year to year, without cessation and without the smallest relaxation of discipline: would it not be wonderful then if labourers so trained and superintended did not become most handy, skilful, and efficient workmen? I think every one will admit the truth of this, and will be fully inclined to believe me when I repeat that they are indeed most efficient and valuable labourers; that they thoroughly understand every branch of their work, and perform it in a highly intelligent and workmanlike manner.

I dwell thus fully on this point, because people are too much in the habit of fancying that slave labour, as it exists in the southern states, is merely that of a set of barbarians, urged on by the whip; labour which can be excelled by white men in the proportion of one of the latter to three of the former. There cannot be a greater error—a more absurd mistake.

If such negroes could be had in our colonies, and would work as they do on the cotton plantation, I would rather have them at Englishmen's wages than any white men I ever saw; and I even doubt whether they would not be worth double the value of a white labourer.

We may, therefore, truly say that the American cotton planter has cheap labour, because it is really so well-trained and so good; so incomparably superior to mere brute strength bunglingly and wastefully applied

I have passed a portion of my life in India, where we have another description of cheap labour, viz., full-grown and able-bodied men at six shillings a month, finding themselves in food and clothing; but how many of these coolies can we estimate as being equal to one trained negro?—The disparity is really enormous, if we quit hand-labour, and come to horse or mule-husbandry, which every agriculturist knows, constitutes the very life and soul of plantation work. It is true that these coolies can be taught—in time, and by dint of personal exertion and perseverance of the most wearying nature, as I well know, having had some thousand of them daily on whom to exercise my own patient determination, and from whom to learn the length, and breadth, and depth of a native's passive resistance to practices opposed to his own prejudices. I reiterate, therefore, this important truth, that the planter of the southern States has at his command such a body of trained labourers as we may seek for in vain elsewhere.

It behoves us, then, to bear this fact in mind, with a view to discover how we can apply our inferior labour, backed by our own energies, in competing successfully with them in the cultivation and supply of both descriptions of cotton.

Let us not shut our eyes to any of our difficulties and disadvantages, but manfully look them all in the face, and apply ourselves to the discovery of means whereby we may satisfactorily overcome them.

The description of labourers which we, as Englishmen, have to deal with, depends of course upon the locality in which we decide to carry out our operations. I will therefore refer to their several merits and demerits as we glance at the suitability of the countries themselves.

Cotton Growing Localities of Britain.

I must ask attention in the first place to the particular climate and seasons demanded by the cotton plant, and to some very marked features in its character.

In the early part of their growth, if the young plants have a few slight showers of rain until they have taken good hold of the ground and become about a foot high, it is surprising how much dry weather they will afterwards stand. Last year, in South Carolina, for seven weeks there did not fall one drop of rain; then they had a few light showers, followed by another spell of dry weather; yet it was considered a good cotton season, the bushes thriving well, and producing abundantly, notwithstanding that the intense heat of the sun had baked the soil as hard as a brick.

In remarking on this peculiarity of the plant, my planter friend replied, "Yes, for cotton we require very little rain indeed, whereas for corn, the more rain we have the more abundant are our crops, so that a very favourable season for the one, is sure to be unfavourable to the other."

In a wet season also, the planter has the greatest possible difficulty in making his cotton crop, for the weeds spring up so rapidly, and will not die, although hoed up repeatedly; whereas in a dry season, a light hoeing suffices to kill them and keep the fields clean.

This endurance of excessive dry weather is something quite remarkable; but I must also mention the hardiness of the plant in respect to cold, which in autumn does not seem to hurt it, unless a really killing frost occurs.

This hardihood gives to the cotton plant a very wide climatic range, although for commercial purposes this range is materially lessened, from the circumstance that it is essentially necessary to have comparately dry weather during the whole of the picking season; or, in other words, a dry autumn is imperative.

Last year (1857), the cotton plantations on the Mississippi suffered extremely from a dripping autumn; the bolls refusing to open, rotted on the branches, and those that did open fairly presented a forlorn appearance, with the cotton hanging down in long lengths, soaked and dripping with water.

The same reason it is which operates against Algeria, and which will prevent its ever becoming a large cotton-producing country, for the autumns and winter there are generally cold and wet, while the summers are generally parched and dry to a degree.

Of the three provinces, Oran appears to be by far the most suitable, although even there the plants require irrigation during the parching heats of summer. But if we go further westward, along the same coast, we shall find at Tangiers, as I am informed, a still more favourable climate and season.

But leaving the northern coasts of Africa, and also the more deadly West Coast (at present the scene of Mr. Clegg's enterprising labours), let us at once direct our attention to a right valuable British colony, enjoying one of the finest climates in the world, with cheap land, cheap provisions, and cheap labour. This is our hitherto neglected colony of Natal, in Kafirland, on the south-east coast of Africa. A three years' residence in that country has given me a sufficient experience of its climate, seasons, and capabilities, to enable me to speak with some certainty on these points, and I give it as my conviction, that in no quarter of the world can a spot be found combining so many advantages, and so peculiarly adapted to the growth of cotton, as our colony of Natal.

1. In the first place, the climate is most salubrious, and, for six months of the year, perfectly delightful, and highly exhilarating.

2. The rains occur during the six months of summer, whilst the other six months are dry, clear, and serene.

3. Suitable lands vary in price from 2s. to 20s. per acre, and being mostly all cleared, the plough can be put into them at once, at the smallest expense and trouble.

4. English farm-servants can be hired at much the same rates that are paid in England, and they in general become much more handy than they are in this country.

5. The natives (Kafir Zulus) may be hired at from 7s. to 10s. per month, besides their simple food, which costs only from £3 to £4 each per annum.

6. Excellent working oxen can be purchased in any number at from £2 10s. to £3 each. Mules, from £16 to £20, and horses and mares, at from £8 up to £20 each.

7. Beef, 2d. to 3d.; mutton, 4d.; pork, 4d. per lb.; fowls, 6d. each.

8. Pasture lands exist to any extent, and are of the most nutritious quality.

9. And lastly, the cotton plant is here perennial.

These facts and figures go to show the extraordinary advantages offered by Natal as a cotton-producing country, but we must not overlook the one great drawback, viz., the want of abundant and really reliable labour; for, at present, Kafir labour, though cheap, is not abundant, and cannot by any means be relied upon in so ticklish a culture as cotton.

This is indeed a very serious drawback; one that would effectually prevent any extensive cultivation of this plant, for when its bolls have opened and the cotton is ready for picking, it must be picked, or the crop will be lost. Fortunately, however, it is a drawback which admits of a remedy, and which the colonists are already taking seriously in hand, although I am afraid that unaided their means will not allow them to carry it out.

The Mauritius, which, after emancipation, was on the very brink of ruin, has not only been resuscitated by Indian labour, but has been raised to a far higher state of prosperity than it ever enjoyed before; and lands of any kind capable of growing the sugar cane have been bought up at £50 per acre. Why should the same remedy not be applied to Natal? Why should this fine colony not be supplied with any number of Coolies she may require, and thus become a great and valuable possession?

I know, along the coast line of 300 miles, abundance of land eminently suited to the growth of the finest Sea Island cotton; land that might be calculated on to yield from 200 lbs. to 500 lbs. of it, cleaned, per acre.

Immediately at the back of this line commences the region for the upland varieties; and what vast tracts are here lying idle, and, at present, next to useless; lands into which the plough may at once be put, and on which steam machinery may effectually aid the planter in all the branches of his work.

A few years ago, some German land jobbers and others got up a Cotton Company; imported a number of raw German families; built cotton houses, and erected machinery for ginning and pressing the bales; but, as in all such crude, ill-digested attempts, this Cotton Company turned out a dead failure, principally from two causes, viz., planting their seed in September instead of November, in consequence of which the cotton became fit to pick two months before the rainy season had ceased; and, secondly, the refusal of the German labourers to continue the cultivation, and their betaking themselves to other occupations.

The failure of this attempt has thrown discredit upon Natal as a cotton producing country; whereas, with a proper supply of labour, it cannot be excelled by any country in the wide world.

The next country to which I must allude is Australia, from the Illawarra district up to the Gulf of Carpentaria on the Eastern side, and the whole of Western Australia on the opposite coast; offering an extent of cotton country so vast that one hesitates almost to speak of it, seeing that at present nothing of the kind can be attempted for want of labour. Yet one cannot help thinking of the multitudes of lovely Sea Islands there are all along the coast, from Moreton Bay up to Cape York, all more or less suitable for Sea Island cotton, and all of which could be readily supplied with labour from India.

But let us pass on to India itself, that noble country, abounding in natural advantages, and possessed of a teeming population. The cotton region of Central India is said to be three or four times that of the Southern States of America, but hitherto its capabilities have not been brought into play, on account of the difficulty of bringing the produce to market from the far interior. Railroads are now, however, opening up this important region, and we may soon expect to feel the highly beneficial results of these wise and politic measures.

I have seen a great deal of cotton cultivation in India, and could dwell upon the subject at very considerable length; but I refrain from doing so, as I am well aware that the Society, at a subsequent meeting, will have a valuable paper on this subject, read by a scientific and highly competent gentleman.

I will therefore merely direct attention to two points, viz., the singular fact that no Europeans have ever attempted to grow cotton in India on their own account, but have contented themselves with buying the native grown cotton with all its imperfections.

Now, I am inclined to think that Europeans might make handsome fortunes by growing cotton in India; more especially, perhaps, were they to devote themselves to the finest Sea Island on the coasts, and down in the Straits of Malacca. With a suitable soil and climate, and labour at from 6s. in India to 12s. in the Straits, per month, I do not see why well organized cotton plantations should not pay well, and become general throughout the country.

The second point to which I would attract attention is, that if the United States employ upwards of seven million acres of land in the culture of cotton, and produce 3 millions of bales, we must bear in mind that India already cultivates double that quantity of cotton land, and produces almost entirely for internal consumption from four to five million bales—a fact little dreamed of in this country or elsewhere, but one which shows us how readily she could supply all the cotton we require, and much more, if the roads were opened and an energetic demand made upon her.

In carrying out the cultivation of cotton, do not let us overlook the assistance which steam machinery offers us; for it is by the aid of such machines as Romaine's, and others of a similar character, that I consider we shall be able to maintain in our colonies a successful competition with the trained labour of the southern states of America. Bear in mind that a really efficient machine of this sort would be equivalent to at least 10 slave "hands" and 10 mules; and knowing this, let us not fear such competition, formidable as it is.

In conclusion, I hope, and most earnestly trust, that our countrymen will, one and all, bestir themselves in this important matter, and never let the subject rest until we can positively assure ourselves that our great cotton manufacturing industry is placed upon a safe and unassailable basis.

DISCUSSION.

The **Chairman** said, considering this matter so very important to the district in which he resided, he hoped he might be excused if he deviated a little from the usual routine with which these meetings were conducted. Before, therefore, he called for the discussion upon the paper, he might be allowed to say a few words with regard to the vital importance of the subject. It had been said in these statistical days that there was nothing so little to be relied upon as facts except figures; but he would venture to give the meeting a few figures which he believed were as approximate to the truth as possible. Mr. Bazley had estimated that there was sunk in the cotton manufactures of this country, and the necessary buildings connected with it, a capital amounting to £50,000,000; that in the machinery establishments and other workshops that supplied the machinery for the same manufacture, there was £50,000,000 more invested, making in all £100,000,000 sunk in this trade. Mr. Bazley also estimated that there was no less than half a million of persons directly employed in the cotton mills, and that at least three more were dependent upon each of these workers, making two millions immediately dependent upon this manufacture, whilst there were two millions more engaged in the other trades which supplied the cotton manufacturers with their machinery. There were, therefore, upwards of four millions of our population dependent upon the working of this great branch of industry. There were no less than thirty millions of spindles at work in the cotton manufacturing districts. The imports of cotton for the present year it was expected would reach one thousand millions of pounds weight. The cotton exports in 1857 amounted to £39,000,000, while the home consumption of manufactured goods was £24,000,000, giving an average of 17s. per head for the whole population of Great Britain; and it was considered a moderate calculation that the whole population of the world consumed cotton manufactured goods to the extent of £140,000,000 sterling per annum, or equal to 3s. per head for the population of the world. He mentioned these figures to show the amount of property at stake, and the importance to the working classes at least, and to such men as himself, of the subject that had been brought before them. He would now show in a few words what this particular trade had done for Manchester, for Liverpool, and for Lancashire in general. In the year 1758, they imported only 2,000,000 or 3,000,000 lbs. of cotton, and he had already told them that in the current year it was almost certain to amount to a thousand millions of lbs. The population of Manchester, in 1758, was only 20,000. In 1858, it exceeded 500,000. The population of Lancashire, in 1758, amounted to 300,000, while that county now contained a population of 2,300,000; then, taking the tonnage of shipping at Liverpool, in 1758, it amounted to only 100,000 tons, whilst, in 1858, it had risen to 5,000,000. He had laid upon the table diagrams of the various cotton gins now in use, for the inspection of the members present, and he hoped that no one would leave the room without a full determination to help on this good cause to the utmost of his power. He had also arranged for the inspection of the meeting specimens of the various kinds of cotton cultivated, according to their relative value, beginning with the Sea Island, Egyptian and Brazilian, next the African, next the great staple of America, which kept them all going, and next the old-fashioned cotton that most of them were familiar with in their childhood—the Nankin cotton; and last of all the cotton of India, which was always found at the lower end of the scale of value. He had also laid upon the table a few maps of those districts of Africa in which he (the chairman) was most interested, together with some other papers connected with that country and its cotton-growing capabilities. He might add, in justice to his friend Dr. Riddell, whom he saw present, that although he had said that India unvariably stood in the lowest position as regarded the growth of cotton, yet Dr. Riddell had proved that India was capable of growing the finest Sea Island samples, and he had before him a specimen of Dr. Riddell's own growing, which was a proof, notwithstanding the assertion of the late Dr. Forbes Royle to the contrary—that the finest descriptions of cotton could be grown in India.

Dr. **Riddell** said—his name having been brought before the meeting, he rose thus early to say a few words upon the subject which had been so ably introduced to their notice. The question before them was that of the cultivation of cotton in America, and therefore he thought the subject of cotton cultivation in India had been rather prematurely introduced; but as his friend Dr. Forbes Watson would shortly read a paper upon the subject of the growth of cotton in that country, he (Dr. Riddell) would refrain from making any remarks upon the subject, further than to refer to what had been just said by the chairman. It was true that India was at the lower end of the scale as regarded the growth of cotton; but that was a question for the Indian government to deal with. Probably the "Pagoda tree" had been so well shaken that there was nothing left to pick off; but he was satisfied that the prospects of that country were opening bright before them, and if anything was calculated to bring the natives to a full understanding of their true position as regarded England, the proclamation of her Majesty which had just been issued would do more than the sword had ever done. He would add that he had paid a good deal of attention to the subject of cotton-growing in India, with the view of introducing a better description than the indigenous cotton. The gentleman who had favoured them with the paper that evening, had told them what other products might be obtained from the cotton plant. They had not only the cotton but the fibre itself, and they had also oil from the seed. With regard to the fibre, there was no doubt that from almost all tropical plants fibres might be obtained, but the question was whether they would repay the trouble in a commercial point of view. With regard to the oil from the cotton seed, they were told that 100 lbs. of seed produced two gallons of oil, equal, it was said, to the oil which they had from Lucca. But he believed that if half the oil sold under that name were subjected to the examination of the *Lancet* Analytical Commission, they would report that the greater proportion consisted of oils extracted from linseed and other seeds of that character. The green seed cotton undoubtedly produced a fine bland oil, but all the oil that he had seen produced from the black cotton seed of India was of a dark colour, such as that on the table. What its use was he could not say, further than that the natives of India burnt it in their lamps. They were told by Mr. Wray that the fine oil from the green seed was worth 6s. per gallon. Now, inasmuch as we could get oils from' various seeds at a much cheaper rate, he apprehended that it would be of little value in England, though in America, no doubt, it was valuable. He did not believe the natives of India extracted the oil of the cotton seed for any other purpose than burning, but they preferred to give the seed as food to the animals employed in ploughing and cultivating the land. He would now only thank Mr. Wray for the valuable paper which they had just heard.

Mr. P. L. Simmonds said that often as the subject of cotton had been brought before the Society, it had lost none of its interest—indeed that interest seemed to grow more and more year by year. The chairman had placed before them the immense money capital and industrial interests involved in the working up of this great staple, and had shown how large a number of the population were identified with a due supply of the raw material. It was, however, startling to think that there was not in our ports at the present moment cotton enough for a month's supply of our mills. The different phases of the cotton question had been brought successively before the members from time to time, but that evening they were brought directly to the consideration of its cultivation in the chief seat of supply—the United States. His friend Mr. Wray, whose acquaintance and correspondence he had enjoyed for a long series of years, was well fitted to deal with the subject in a practical point of view, from his great and varied experience as a planter in different parts of the world. He had resided in the West Indies, in British India, in the Straits settlements, and in Natal—and in all those localities he had been eminently useful and singularly energetic. It was but recently that he had acquired a wide and deserved celebrity for introducing into the temperate regions of Europe and America an admirable variety of African sugar-cane, a species of *Holcus*, calculated to be eminently useful both as a sugar yielding and a fodder plant; and while introducing this in America he had not lost sight of the interests of his countrymen, but had studied carefully the whole process of cotton culture as practised in the States, and of which comparatively little was generally known. Leaving to others the discussion of various topics arising out of the very interesting paper just read, he (Mr. Simmonds) would confine his observations chiefly to the consideration of those auxiliary products of the cotton plant, (other than the wool), which had been incidentally noticed by Mr. Wray, and which it had been too much the custom to overlook in treating of cotton cultivation. They formed in the aggregate a very important item in the returns, and if properly developed might become great commercial products. There was no doubt, from the chemical researches of Dr. Jackson, of Boston, Professor Shepherd, of South Carolina, Professor Anderson, of Edinburgh, and others, that cotton seed might be profitably employed in the production of a rich oil; that the woolly fibre adhering to the hulls might be economised in the manufacture of paper, while the substance of the seeds could be employed more generally for feeding animals, and also as an excellent fertilizer. It was extensively used in the Southern States as a manure for Indian corn, for which it was found most useful. There could not be less in all the cotton-growing countries than 1½ million tons of seed available annually for agricultural and commercial purposes. Two years ago he had called the special attention of our agriculturists to the subject of cotton seed in the *Farmers' Magazine* and the *Mark Lane Express*, in some suggestions of new sources for obtaining oil cake for feeding purposes and for manure, in these words:—"Another equally extensive field of supply, scarcely touched, is cotton seed cake." And after going into the statistics of the cotton production in Asia and America for a series of years, he added:—"Each pound of ginned cotton produced yields about three pounds of seed, and after reserving one half the seed for planting, the remaining cotton seed of the United States might be made to yield at least 400,000 tons of oil cake, the produce being about 50 per cent." This cotton seed cake was now exported largely from the United States to the Mediterranean, and it was imported to a small extent into this country from several American ports, in round cakes from Ohio, from Boston, Albany, and other quarters, and the finest American cake was imported in barrels. Analysis showed that these cakes were characterised by the presence of a larger proportion of oil than was usually met with in those of European manufacture, and the quantity generally was good. The oil varied in them from 9 to 161 per cent., and the albuminous compounds fluctuated between 26 and 31 per cent. The oil, stearine and oleine, made the best kind of soap for woollen and other goods, and either the hard or soft soap from it was found to be excellent for fixing Turkey red and other difficult colours. Cotton seed cake held a very respectable place compared with other oil cakes as an article of food for cattle, containing about 9 per cent. of oil and 25 per cent. of albuminous compounds, the two most important constituents in any feeding stuff. It could be used profitably as a substitute for linseed cake if the price were not too high. The number of seeds found in one capsule varied in different species of cotton from 5 to 12. Mr. Wray had told them that the short staple cotton yielded two to three pounds of seed to each pound of ginned cotton, and the Sea Island about 4 lbs. As yet, only the smooth black seed, he believed, had been used for the purpose of manufacturing oil, the downy seed resisting the action of the machinery, but machines could, doubtless, be invented to overcome the difficulties encountered with the woolly seed. In some varieties of cotton the seeds were free, oblong, black, and without any other pubescence than the long, fine, easily separable, white wool; in others the seeds were free, clothed with finely adhering greyish down, under the short staple white wool; while in a third kind the seeds adhered firmly to each other, so as to form a clustered mass resembling a kidney, black, and free from every pubescence except the long white wool, which was easily removed. He had placed upon the table for the inspection of the members, these several varieties of seed from his private collection, and the ordinary dark cotton seed oil met with in this country. The manufacture of oil from cotton seed had been carried on in the south for a greater or less extent for several years past. At Natchez one of these mills had been in operation for ten years or more, but so far the oil had not come into general use. The difficulty seemed to be in clarifying it, as it would not burn in a crude state. If this could be done successfully, it would prove a most important article of commerce. A recent writer in a Cincinnati paper, assuming that cotton seed yielded 30 per cent. of oil (although 40 and upwards had been obtained by good pressure), stated that the total product of oil that could be obtained from the seed raised in the United States would be 84,000,000 gallons, the residue being oil-cake, amounting to 700,000 tons. Although, from the samples he had seen, he doubted its applicability as a salad oil, it burned with great brilliancy, and was particularly fitted for using upon heavy machinery, on account of its not running or drying; it might also be useful for leather dressing. In many parts of India cotton seed was a distinct and important article of commerce, and, as Dr. Riddell had stated, in great request for feeding cattle. It was usually taken on board home-bound ships with grain for feeding milch cows. The supply of cotton seed was almost inexhaustible, as the sources were unlimited in the cotton-producing countries. In this country cattle did not take readily to the cake at first, but eventually they got to like it, and throve upon it. Opinions differed as to its fattening properties for sheep compared with linseed cake, but the much lower price at which it could be sold (nearly one-half), was certainly a very material consideration. The value of the fibre he was not prepared to enter upon, and this required further experiment. But the money value of the oil and oil-cake alone was shown by Mr. Wray to be considerable, and therefore well worthy of attention where cotton was grown on a large scale. He would be glad to hear Mr. Wilson's opinion of the commercial value and character of cotton seed oil.

Mr. G. F. Wilson, F.R.S., said that as his name had been mentioned, he ought perhaps to say a few words respecting the oil and grease from cotton seed. The quantity the author of the paper gave, as capable of being produced annually in America, amounted roughly to 200,000 tons, or more than four times the quantity of all the palm oil which came to this country. Its magnitude therefore rendered it well worthy of consideration. Cotton seed, principally, he believed, from Egypt, had been crushed in this country in considerable quantity, and the seed had been even freed from its surrounding fibre by means of machinery. While he agreed with Dr. Riddell's remark that India was too rich in seeds containing oil,—at least as valuable as that of the cotton seed, cheaper and easier of extraction, from being more lightly held in their matrix,—to make it probable that the cotton seed would be worked there on any very large scale, yet he might mention that oil, as dark coloured as the specimen shown, was, when newly extracted, easily refined, and then became of about the colour and appearance, and, he believed, of nearly the value, of mustard seed oil, or of the coarser description of rape seed oil.

Mr. Frederick Lawrence said he was one of the class referred to in the paper who could not distinguish between one quality of cotton and another; but there was one question which had nothing to do with quality—that was the labour question; and he thought they had learnt that evening something very startling, namely that the real cause of the prosperity of the American cotton growers was the whip. They learnt from the paper that the way to make a good labourer was, when he was a child, to show him the whip; when he got a little older, to make him feel the whip; in fact, to bring him up under the whip; and then it was agreed that he must be a good hand because he had everything to make him a good labourer and nothing to make him a bad one. He could not quite agree with that doctrine, nor did he admit the comparison made by Mr. Wray, of negro labour with other labour. It was asserted that the coolies could not work so well as the negroes, and that an Englishman could not do so much work in cotton cultivation as the slave labourer. No doubt the climate would have much to do with this, but Mr. Wray had not told them how he thought free labour would answer in the United States. He (Mr. Lawrence) could have wished they had been told how, in the opinion of Mr. Wray, the laying out of ten shillings per week—which it seemed was about the cost of a slave—in the wages of a free labourer would answer in cotton cultivation. That was a question which he thought would be interesting to all present.

Mr. Jones mentioned that he had been informed by an American cotton-planter that the annual value of the labour of a slave was £80, and it had been stated by the American Consul that the value of the slaves in the United States was no less than £800,000,000, or equal to our national debt.

Mr. Hyde Clarke said that one especial value of Mr. Wray's paper was the marked distinction drawn between the varieties of cotton, a subject of great importance, more particularly at this moment, when so much discussion was going on as to the application of irrigation in India to the long and short staples of cotton, and as to which so much diversity of opinion prevailed, particularly as to the irrigation of cotton districts. The application of the cotton products was another interesting point. The explanation of the failure of the cotton experiments in Natal was likewise very desirable at that moment, because great discredit had fallen on cotton cultivation in that colony. The present moment was one of great promise for cotton in that district, for if the Natal colonists succeeded in the application of coolie labour to the sugar crop, they would be encouraged to resume the cotton cultivation, and there was no reason why they should not be able to do for Natal what the Mauritius had done for sugar and Ceylon for coffee, by obtaining coolies from the abundant labour market of India. Mr. Wray's paper was of the greater importance because the United States afforded not only materials for the history of the past, but an example for our guidance in future operations. For instance, if we were really to do anything in India, it must be by profiting by the experience of the States, by watching what had been there done, ascertaining the principles in operations, and applying those principles. He thought that the enterprise and energy of the Anglo-Saxon race had been the main instrument of progress. The broad fact remained, that, in spite of all difficulties, the resources of India had continually advanced, and this progress could be ensured, and its speed increased by the further application of the same agency as in the United States, viz., the enterprise and intelligence of an Anglo-Saxon population. In this point of view the formation of English colonies in those parts of the healthy hill regions near the cotton districts was of great importance. The organisation of labour was another element, and this was dependent on the application of intelligence in its direction. The population of negroes would never of themselves have created the cotton trade of the United States, nor had the population of India been able to supply the demands of commerce. The land question was a most important element in the comparison. In the United States land was free and cheap, and fresh land could be acquired for the cotton cultivation, but in India no freehold could be acquired, and the holders of lands held on grant terms were at the mercy of the revenue authorities and their corrupt dependents. Good communication by water and by land for the transport of produce had been established in the United States by the efforts of the government and individual citizens, but in India it had yet to be established. The water and railway communication created in the valley of the Mississippi within the last quarter of a century exceeded all our efforts in India. He had that day received a letter from India, stating that in the Darjeeling district of India—one very interesting for the growth of Sea-island cotton—a branch had been formed of the English Settlement Association, and that one point to which attention would be particularly directed would be the development of the cotton cultivation.

Mr. WINKWORTH said that, complete in all respects as the paper now under discussion would seem to be, there was a country now fully opened to us, in which the question of labour could not be difficult—he meant China—of which alone Mr. Wray had said nothing. His experience of the recent history of an analogous raw material, as regarded relative demand and supply—viz., silk—afforded encouragement to believe that a similar amount of attention to the cultivation of cotton in that country would produce the most important benefits. He wished, therefore, to ask Mr. Wray whether China did afford elements of encouragement to expect sooner or later a supply of cotton for our manufacturing wants.

Mr. WRAY would reply to the several questions raised in the course of the discussion, by commencing with the subject of oils. The specimens upon the table were by no means of the description to which he alluded. They were quite a different product. These were the crude productions of unskilful hands. What he had spoken of was the oil made in large manufactories in America by skilful men, practised in the art. He had said nothing at random on that point, for it was the fact that oil was made in large manufactories, both in the north and in the south, from American cotton seed; and that oil, as he had stated, was selling in New Orleans at four shillings per gallon, and fetched six shillings per gallon in New York. Those prices had no reference whatever to the cost of production, which might be only a few cents per gallon. It should, however, be understood that the oil was almost entirely made from the green Upland seed. It was necessary that the seed should undergo the process of hulling, or removing the husk which enveloped the inner portion of it, from which the greatest amount of oil was obtained. This hulling machinery had been brought to great perfection in the United States, and was the subject of numerous patents. The oil he had alluded to was of a very fine quality, and was certainly sold at the prices he had mentioned. The next point was that of irrigation. He thought that, next to railways, he looked for the greatest benefits to accrue from a proper system of irrigation in India. To understand that question properly, they must be acquainted with the nature of the climate and seasons of India, and a residence of many years in that country enabled him to speak with tolerable accuracy upon that subject. The rainy season commenced generally about the middle of the month of June, and lasted till about the 21st September. For the cotton plant that was too short a time. The consequence was that it was usual to plant the cotton before the rainy season came on. In the upper parts of the country that was the time when the hot winds prevailed, which he could only compare to the blast of a furnace. The earth became parched, and the seed at that period stood in need of irrigation, otherwise it would not germinate, but if sown with irrigation, and followed up by one or two subsequent irrigations, the plants became well-rooted, and would perhaps be a foot or 15 inches high when the rains set in. The growth then began with amazing rapidity, and by the time the rains ceased there was a fine plant. Then they had the seething month of October, and this was, perhaps, the most oppressive month of all in India, but it suited the cotton, which began to open its bolls in the latter part of October; then followed the fine month of November, which was succeeded by the cold months of December, January, and February. But at this latter period they had another change of climate. From September, when the rain ceased, there was sufficient moisture in the ground to maintain the plant in a vigorous state for a considerable time, but about December it began to flag again. In some years there were no showers during the whole of the cold season; and the entire crops in the upper districts required irrigation. Thus, therefore, the plant had to undergo three different seasons, first the dry season, during which it must be sustained by irrigation; then the next three months of rain, which was sometimes very trying to the plant, and subsequently there was the second recurrence of dry weather, when they looked for the cotton to be produced, and when irrigation again came to the planter's aid. Whatever they might say of cheap labour in India—and he had had as many as 1,500 men daily at work on his estate,—whatever they might say with regard to Indian labour as applied to irrigation, it was expensive compared with the irrigation which Europeans could effect by means of machinery. When they came to the cost per acre, they could judge whether it was cheap or not. The system of irrigation which the natives of India still pursued had been in use amongst them from time immemorial, and at present there was no such thing in the cotton districts of India as irrigation by means of machinery. The time at which irrigation could be successfully pursued was the ripening season, and irrigation at that period furnished the plant with the very thing it wanted, and they could irrigate and pick the cotton at the same time. The next point was with regard to the quality of the cotton of India. He might say the operation of irrigation properly carried out would bring into cultivation immense districts of country near the the coast, which had never yet been brought into cultivation. On the coasts—take, for instance, the Sunderbunds, near Calcutta, a vast tract which, although unhealthy to European constitutions, was well adapted to the long staple cotton,—the soil contained a certain quantity of saline matter, in which the cotton plant was found to thrive, indeed, it was in a similar description of soil that such large crops were grown on the Sea Islands, South Carolina, and he believed there were districts in India which were capable of producing as good cotton as South Carolina. The next question was with reference to China. The climate of China, he did not consider himself competent to speak of. He did not know whether the autumns and winters were wet or dry, but he believed they were wet. They must, however, remember that China had the enormous population of 500,000,000 of inhabitants, and they were obliged to cultivate every scrap of land, and to get two or three crops a year in order to support so vast a population. It was not a cotton producing country—it could not even supply its own wants. A large quantity, indeed the great bulk of Indian cotton exported, was sent to the Chinese markets. He looked to our Indian possessions to supply a much larger amount of that commodity to China, now that that country was more fully opened up to our commerce. He had had as many as three hundred Chinese labourers in his own employment, and, if properly managed, a finer body of men did not exist; they were docile, hard-working, and sober, and did their work well. The last subject was that of slave labour. He had endeavoured to say as little as possible upon that point. He had stated in the outset of his paper that he would keep to facts and figures, and that he would treat the subject strictly in a business point of view. As business men, they had nothing to do with the question of slavery. He had directed attention to the fact that there was a certain class of highly trained labour in America, and it was not a point for their present consideration how it was obtained. He had seen the labourers of many countries, and he could state it as a certain fact that in America they had labour of the most skilled description for the culture of cotton, and that fact they must not ignore. He never knew the pitch of perfection to which negro labour could be brought until he witnessed it on the property of Gen. Hammond, ex-Governor of South Carolina. He repeated that they had inferior labour in India to that of America. As Englishmen they were never going to resort to the whip, and therefore they must endeavour to discover some other means of competing with that highly-trained labour. Our countrymen had great perseverance and energy, and we had in our own colonies an extent of land, beyond anything he could mention, suitable for the cultivation of cotton, and wherever there was scarcity of labour, it could be imported. But there was another point which he thought was important, namely, the introduction of steam machinery. He was one of those who saw plainly that they must use steam machinery in the cultivation of the land, and it would, in fact, be far superior to slave labour—for it was a slave that never tired, that wanted no whip, and of which our countrymen would never be ashamed.

The Chairman felt personally obliged to the meeting for the great attention which had been given to this subject. As the question of slavery had naturally been touched upon, he could not but take the opportunity of expressing his great abhorrence of the system, and, moreover, in his opinion, it was quite possible to get as much cotton as they wanted—abundant and cheap—without any slavery at all. Some ten years ago, seeing the importance of the subject, he thought he would, as an individual, see if he could not get cotton from somewhere else than from America. He turned his attention to Africa, and he asked the Church Missionary Society, of which he was a member, to select for him suitable agents, to whom he could entrust money for the purchase of cotton from the African natives. He made arrangements always to have money on the spot, in the hands of the agents, and his instructions were, that they should purchase the cotton of the natives, in however small parcels it might be brought to them—if only half-a-pound had been plucked from the wild plants, they were to buy it. The consequence was, that in a short time the women brought small quantities of cotton to the stations; this was communicated to their neighbours, and, in a little time afterwards, seed was planted, and the cotton bushes became more and more plentiful. He sent out a number of cotton gins, and the natives soon learned to use them. He also erected a store, and placed a large number of gins in it. The natives brought the cotton in pods and in seed, and they learned to clean it, and after using a gin sufficiently long to pay the expense of it, they shouldered the implement, and carried it off as their own property, to be used hereafter in dressing the cotton they brought for sale. He had introduced three young African natives into his mill, at Manchester, where they had been taught the use of machinery generally, and they were sent back to their own country, to carry out the preparation of cotton upon a larger scale. He had received cotton from Africa in the following quantities:—In the first year, he was able to collect only 235 lbs.; the next year, it was 1,810 lbs.; in the third year, it was 4,617 lbs.; in the fourth year, 1,588 lbs.; in the fifth, 1,651 lbs.; but whilst he was receiving these small quantities, he was teaching the young men in his mill. After they got back to their own country, there was an increase in the quantity of cotton to 11,492 lbs. in the next year; in 1857, the quantity was 35,419 lbs., and there was lost by fire, in addition, 38,080 lbs.; and this year he had already received and sold 1,207 bales, and since his arrival in London he had received bills of lading of 612 bales in one vessel at one time, so that, up to the present moment, single-handed, he would have received, up to the end of October, no less than 1,819 bales of African cotton. If one individual could effect this, what might they not hope would be the result of the united operations of a number of persons in promoting such measures as those, wherever it was found that cotton would grow. He had not been contented with the West Coast of Africa alone, although it was proved that cotton would grow abundantly there. At Tunis, he, with other persons, had commenced a cotton-growing company, and 1,500 acres of land were under cotton cultivation there. The association, however, commenced their operations so late in the season, that they could not get a good crop, but it had been demonstrated that good cotton could be grown in Tunis by free labour. He had recently received a letter from the Bishop of Natal, in which he stated that the impression in that colony was, that the cotton crop would only yield £1 3s. 4d. per acre; but, from statistics which he (the Chairman) had seen, it was proved that the land, under cotton cultivation, would yield a return of £12 10s. per acre, whilst by growing maize they only got a return of 40s. or 50s. A gentleman, residing at Natal, had expressed his willingness to devote an estate of 8,000 acres to the cultivation of cotton, and to find the money to work it. He (the Chairman) had also received a helping hand from Dr. Livingstone, at whose disposal he had lately placed £500 for the purchase of cotton, and for otherwise forwarding the object he had so much at heart. He was also commencing two new stations on the West Coast of Africa, where he had eight presses at work, capable of turning out 80 bales per day each; and he was about sending out five others, of larger size, which would be able to turn out 130 bales per day. He would say, in conclusion, that he felt heartily obliged to Mr. Wray for his paper, and it was a source of great satisfaction to him to find so many persons taking an interest in this subject. As regarded the interests of Manchester, it was a question of life and death; therefore, he called upon all present to give their aid in this important movement. The Chairman then proposed a vote of thanks to Mr. Wray, for his able and useful paper.

A vote of thanks was then passed to Mr. Wray.

Mr. Wray, in acknowledging the compliment, begged to disclaim all personal sympathy with the system of slavery.

The Secretary announced that the next meeting of the Society would take place on the 19th of January next, when a paper would be read, in the French language, by Monsieur Théophile Silvestre, on " Les Arts, les Artistes, et l'Industrie en Angleterre depuis la dernière moitié du dix-huitième Siècle jusqu'à ce jour."

THE IRON TRADE OF FRANCE.

A correspondent of the *Times*, dating from Paris, December 20th, says:—

The *Moniteur* publishes the Customs returns for the month of November last, and for the past 11 months of the present year. These are the first which have yet appeared as showing the effect on French trade of the non-renewal of the October decrees, and therefore possess more than ordinary interest. It is not, perhaps, forgotten that the decrees I allude to admitted English and Belgian iron virtually free of duty, if re-exported in a manufactured state. The Prohibitionists maintained that the provisions of the decrees were not faithfully carried out, and that large quantities of foreign iron were not re-exported, but were introduced into the general trade of the country. They required that all consumers should be compelled to come to their shop by imposing an all but prohibitory duty upon raw iron, no matter to what purpose it might be applied, and that they would undertake to amply supply all their wants, pay higher wages to their workmen, employ more hands, and consequently contribute to the greater prosperity of the State. They further declared that, if foreign iron were not admitted, under guarantee for re-exportation, the importation would be reduced, as it would be impossible to admit it in the general commerce of the country. Now, it was a serious charge for the Protectionists to make against an important and respectable section of the community, that they evaded the fiscal laws of the country, defrauded the Treasury, and were, in fact, no better than vulgar smugglers. It was, however, made so openly and so boldly that people believed it; and it is only now, with the evidence of the Customs' returns before them, that they see how utterly unfounded was the charge, and how regardless of truth were those who made it.

The total quantity of pig iron imported last month was 9,298 tons against 10,292 in November, 1857, and against 11,179 tons in the corresponding month of the preceding year. The regularity of the decrease in each month of the three years proves that the importations have been but slightly affected by Customs' regulations, as it does the falseness of the allegation about the fraudulent introduction of foreign iron. It is the same with bar iron, of which 1,684 tons were exported last month, against 4,416 in the corresponding month of last year, and against 6,276 tons in November, 1856. Here, again, the progressive decrease shows that the cause must be looked for in the decline of trade. What proves this to be the fact is, that the importations of other metals against which French manufacturers are not protected have fallen off in much greater proportion. Thus, on comparing the importations of last month with the corresponding month of last year, it will be found that those of copper fell from 1,472 tons to 1,210 tons, of lead from 2,285 to 1,196 tons, and of zinc from 2,782 to 1,262 tons.

These figures show that no iron was fraudulently introduced, and that the decree authorizing its admission in bond to be manufactured into goods for re-exportation was positively beneficial to French trade; also that, however high protective duties may be carried, there will always be a certain quantity of foreign iron admitted by the laws of demand, because the French ironmasters, in their grasping after large profits, will always keep up their prices to a level with the cost of foreign iron in France. Any reduction in importation will therefore follow from a falling off in the general consumption. It is the national consumer who will suffer, by being compelled to pay exorbitant prices for the material he absolutely requires, and to reduce his wants to those narrow limits when he will be forced to use charred wood for ploughshares and oyster-shells for razors! The loss to foreign traders will be comparatively slight, and will be more than compensated by the gradual expulsion of French goods from foreign markets, in which it will be impossible for the latter to compete when the cost of production is rendered so extravagantly high by the artificial value of so necessary and extensively employed a material as iron.

Colonial Correspondence.

THE MANATI.

Sir,—In Goldsmith's "History of the Earth and Animated Nature" I find a description of the manati, —so called from the Latin word *manus*, because the fin or paw of that animal bears some resemblance to a human hand. That description is partly correct, and partly incorrect. It is as follows:—

"The eyes are very small in proportion to the animal's head, and the ear-holes—for it has no external ears—are so narrow as scarcely to admit a pin's head. The tongue is so short that some have pretended that it has none at all; and the teeth are composed only of two solid white bones, running the whole length of the jaws, and formed merely for chewing, and *not tearing its vegetable food*."

I will not dwell upon the absurdity of an animal *tearing vegetable* food.

I have lately obtained possession of the head of one of these extraordinary animals, and I am therefore in a position to give a correct description of it.

It is quite true that there is no external appearance of any ears, and that the tongue is much shorter than that of a cow; but it is a great deal thicker. The eyes are comparatively small, but they *appear* to be much smaller than they really are, in consequence of their being overlopped by a thick lid. The description of the teeth contained in the above extract is quite wrong. I have now the skull before me, and a very singular one it is. The animal possesses no incisors, it is true, neither has it any canine teeth,—the latter being totally unnecessary, as it feeds entirely upon the marine herbage, which grows in great abundance at the mouths of the rivers in this country. But in the upper jaw there are no less than twelve large molar teeth, and in the lower jaw there are fourteen. Goldsmith says, "It is very probable that this animal's flesh somewhat resembles that of turtle, since they are fed in the same element, and upon the very same food." This is very inconclusive. We might just as reasonably say that the flesh of sheep must resemble that of cows, as those animals feed in the same element, and upon the very same food; and for the same reason turkey must resemble goose, and turbot, salmon. The fact is, the flesh of the manati is as unlike that of the turtle, as it is possible for one kind of flesh to be unlike another. The flesh of the turtle is tender and fibrous, that of the manati is short and hard. Even the fat more resembles cartilage than that pinguinous substance.

The author of the book before referred to also says:—

"The turtle is a delicacy well known among us; our luxuries are not as yet sufficiently heightened to introduce the manati, which, if it could be brought over, might singly suffice for a whole corporation."

There is a vast difference between these two animals. The turtle, when fresh and in good condition, is the most delicious, and at the same time the most digestible of food. The flesh, which is white and delicate, is covered with a thick stratum of green fat, and the fins are glutinous. The bone which covers the breast, is intermingled with a thick cartilage, which, when boiled down, becomes perfectly tender, and is often in England mistaken for green fat. The manati possesses no such claims to the regard of corporations, either aggregate or sole. I do not think that there is an alderman in any corporate town of England (I won't bargain for Scotland, for those who can eat singed sheep's *heed*, and call it luxury, would perhaps rejoice in it) who would not turn up his municipal nose at it; and there is no round, plethoric vicar who would not infinitely prefer his turkey and chine, or the savoury crackling of his tithe pig, to all the manatis in the world. I am, &c.,

R. TEMPLE.

Belize, B. Honduras, November 17th, 1858.

Home Correspondence.

MR. REED'S PAPER ON THE SHIPS OF THE ROYAL NAVY.

Sir,—Upon the interesting and instructive paper read by Mr. Reed on Wednesday last, I beg to offer a remark.

It is apparent that in the application of steam-power to nautical purposes, a change in navigation has been induced, which will now render supremacy upon the ocean more dependent upon the high speed of war vessels than upon magnitude and capability of carrying heavy ordnance. Admitting such to be the fact, I am of opinion that comparatively small, but fast and properly constructed steamers, armed with submarine explosive shells, which can be towed, or otherwise brought by such vessels into hugging contact with vessels of inferior speed, or monster ships armed with cannon, will prove more than a match for them under hostile conditions.

It is only by experiment, or by actual combat, that such a problem can be solved ; but I would most humbly suggest the propriety of its solution experimentally, ere more labour and skill be expended upon vessels that may prove useless, and upon which we may chiefly depend as a means of defence. I am, &c.

J. HARVEY, Capt. R.N.

Harnden, Sandwich, Dec. 20, 1858.

Sir,—In the report of the discussion after Mr. Reed had read his highly instructive paper at the Society of Arts, on the evening of Wednesday last, I am made to say that it was with the *present* military rifle that I pierced an iron plate of three-eighths of an inch thick at sixty yards. What I did say was that, with the two-groove military rifle, using an elongated rifled *iron* shot, I pierced a plate of the toughest *Russian* iron three-eighths of an inch thick, at the distance of sixty yards, more than six years ago at Cork, during the time of the national exhibition there. I beg you will be pleased to have this letter inserted in the next number of the *Society of Arts Journal*, as the two-groove rifle was a *strong* one of 14 to the bore, and the iron or steel shot was three diameters of the bore in length, and had two elliptic tetons or nipples of lead at its base, to fit into the two grooves of the rifle, whereas the present service rifle is only 24 bore, and I should not like to make a similar experiment with it, not considering it to be sufficiently strong to bear such a trial. I am &c.,

J. NORTON.

Rosherville, 20th Dec.

Sir,—The following is the description of the American Steam Ram and Battery, which I received before reading my paper at your Society's last meeting, and to which I made incidental reference on that occasion. It was obtained, as I then said, by a stratagem, and is valuable as the record of an eye-witness. I am, &c.,

E. J. REED.

"Mechanics' Magazine" Office,
166, Fleet-street, London, 20th Dec. 1858.

"Stevens' Steam Battery is an iron vessel, now building for harbour defence *only*, under a contract with the late Robt. L. Stevens. It is about 440 feet in length and 50 in breadth, and is built apparently for speed, being very sharp forward, with clean run, greatest breadth abaft the centre of length, and with flat floor. She is now built up only to about the light load line. the 'planking' being ½-inch boiler plate double riveted to U-shaped angle iron 'timbers' about twenty inches apart; no 'ceilings' as yet; 'deck-beams' of U-shaped angle iron are in for two rather low decks, and the hold has on each side a large iron tank, extending some 200 feet amidships, and leaving but about twenty feet of space between the two tanks on the line of the keel. Each tank appears to be independent of the other, and at the forward end has an inclined engine, very heavily proportioned, which seems to be arranged for condensing air into the tank. Over the top of the tanks are large pipes of boiler plate, connecting the engine with the tank at several places, as if the tank were composed of subdivisions. No propelling apparatus is yet apparent. The plan, *as report says*, is to carry a heavy battery, of long range, as near to the water as possible, using the air tanks to secure safety from sinking if pierced by a shot below water, or from water which would wash into the low ports. The battery to be covered by a sloping roof so that shot would glance off, and the vessel to have speed enough to be able to keep at long range. The original appropriation by Congress was 500,000 dollars 'toward' the construction. The executors have claimed that a little over 800,000 dollars has been expended, and that about as much more will be required to complete the vessel, though whether this is to include equipment and armament is not definitely stated. There has been much doubt expressed if the thing will ever be completed, although Mr. Stevens did contract for a specific sum, and of which he had received on account the appropriation of half-a-million dollars, as above. At present, there is only enough work doing to justify the expression that 'the work is progressing.'"

MEETINGS FOR THE ENSUING WEEK.

Mon.......Actuaries, 7.
Tues. ...Royal Inst., 3. Prof. Faraday, "On Metalline Properties—Lustre, &c."
Wed. ...London Inst., 3. Mr. T. Rymer Jones, "On the Natural History of the Vertebrate Division of the Animal Kingdom."
Thurs....Royal Inst., 3. Prof. Faraday, "On Metalline Properties—Chemical Power, &c."
Sat...... Royal Inst., 3. Prof. Faraday. "On Metalline Properties—Heat, Electricity, Tenacity, &c."

PATENT LAW AMENDMENT ACT.

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APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, December* 17, 1858.]

Dated 1*st November*, 1858.

2428. F. Wrigley, Manchester—An improved self-acting safety coupling for railway and other purposes.

Dated 10*th November*, 1858.

2518. J. Corner, 15, Artillery-place, and 16, City-road, Finsbury-square—Imp. in machinery for making metallic screw rivets, and for uniting with them parts of boots, shoes, portmanteaus, leather hose, buckets, harness, and other leathern articles.

Dated 16*th November*, 1858.

2572. A. I. H. Parent, Paris—An improved manufacture of buttons and the apparatus employed therein.

Dated 17*th November*, 1858.

2586. E. Welch, 63, St. John's-square, Clerkenwell—Imp. in the manufacture of tobacco, and in apparatus therefor.

Dated 20*th November*, 1858.

2638. W. Lea, Wolverhampton—A method of lubricating cocks and taps.

Dated 26*th November*, 1858.

2684. J. Harrison, Blackburn—Imp. in rollers applicable to sizing dressing, calendering, and squeezing machines.
2686. A. Bowie, Glasgow—Imp. in governors for marine engines.
2688. M. A. F. Mennons, 39, Rue de l'Echiquier, Paris—An improved manufacture of leather. (A com.)
2690. T. B. Hubbell and G. J. Rollason, Castle-street—Improved apparatus for brightening and polishing metal surfaces.
2692. W. Richards, Harpur-street, Red Lion-square—Imp. in the construction of gas meters.

Dated 27*th November*, 1858.

2694. J. Spratt, 71, College-street, Camden-town—Imp. in the manufacture and strengthening of paper.
2698. R. Alexander, Dillichip, Dumbarton, N.B.—Imp. in treating, preparing, and bleaching textile fabrics and other materials.
2700. H. L. Pattinson, Stotes-hall, Jesmond, Newcastle-upon-Tyne—Imp. in utilizing the heat of slags of iron and other works.
2702. G. B. Sander, High Holborn—Imp. in jugs.
2074. S. Diggle, Radcliffe, Lancashire—Imp. in pattern chains, or other such apparatus used in weaving.

Dated 29*th November*, 1858.

2706. L. A. Possoz, Rue Neuve St. Augustin, No. 9, Paris—Manufacturing alkalies, and obtaining simultaneously other chemical products.
2710. G. Collier and W. Noble, Halifax—Imp. in means or apparatus for the manufacture of spokes for carriage wheels, which improvements are also applicable to the cutting of wood for other purposes.
2712. G. Hadfield, Carlisle—Imp. in the construction of carboys, barrels, and other vessels of capacity.
2714. C. Hancock, West-street, Smithfield—Certain imp. in the insulation and manufacture of electric telegraph wires and cables.
2716. W. A. Henry, Sheffield—Imp. in machinery or apparatus for attaching the soles and heels of boots and shoes to the upper leathers, and in the fastenings employed for that purpose.
2718. J. B. Blanjot, 8, Rue Thevenot, Paris—Improved petticoats for ladies.
2720. C. Bedells, Leicester—Imp. in the manufacture of elastic fabrics, and in the machinery employed in this manufacture.
2722. G. J. Bensen, 7, Christian-street, St. George's-in-the East—Imp. in cleansing or purifying animal charcoal after it has been employed by sugar refiners.

Dated 30th November, 1858.

2726. A. A. Burton, 30, Wych-street, Strand—A moveable face and handle for smoothing irons.

2728. D. Thomson, Old Brompton—Imp. in machinery for raising water and other liquids.

2730. A. E. C. Scheidel, Watling street—Imp. in fastenings for belts, braces, garters, books, portemonnaies, portfolios, pocket-books, invoice, writing, and cigar cases, reticules, bags, and other similar articles or purposes. (A com.)

2732. W. E. Newton, 66, Chancery lane—Imp. in telegraphing and in telegraphic apparatus. (A com.)

2734. J. Coulson, Newark—Imp. in threshing and dressing machines.

Dated 1st December, 1858.

2736. R. H. Bow, Edinburgh—Imp. in railway chairs and fastenings.

2738. E. Jones, Dudley—An imp. or imps. in the manufacture of coke in ovens.

2742. J. Samuel, Great George-street, Westminster, and J. Nicholson, Wellington-street, Bromley—Imp. in, and in connection with, marine and other steam engines.

2744. H. Adcock, City-road—Imp. in furnaces and apparatus for annealing wire.

2746. G. W. Bales, Ipswich—Imp. in apparatus for retaining doors, sashes, or frames, when shut or closed.

2748. S. Newington, Ticehurst, Sussex—Imp. in agricultural implements.

2750. F. Fincham, Ravenhead, Lancashire—Imp. in the construction of annealing kilns or ovens.

2752. J. Lewis, Elizabeth, U.S.—Imp. in means for attaching sails to the yards of ships or vessels.

Dated 2nd December, 1858.

2754. L. MacKirdy, Glebe Sugar House, Greenock—Improved combined bathing, washing, and water-closet apparatus.

2755. L. MacKirdy, Glebe Sugar House, Greenock—Imp. in the manufacture of sugar.

2756. J. Rogers, 9, Queen-square, Bartholomew-close—Imp. in the manufacture of ropes, cables, cords, and lines.

2757. W. Robertson and J. G. Orchar, Dundee—Imp. in machinery or apparatus for winding yarns or thread.

2758. J. Tyssen, Rotterdam, Holland—Imp. in obtaining and applying motive power.

2759. J. Baillie, Vienna, Austria—Imp. in the construction of railway wheels.

2760. Lieut.-Col. G. Spiller, R.A., 15, Upper Southwick-street—Imp. in knapsacks for military and other purposes.

Dated 3rd December, 1858.

2761. M. Henry, 84, Fleet-street—Imp. in manufacturing or revivifying bone black or animal charcoal, and in kilns or apparatus employed therein. (A com.)

2763. M. Tooke, Norwich—Imp. in apparatus for measuring the human figure, and in applying the same for tracing out garments for the human figure.

2765. S. Peters, 12, Rue de la Briche, at St. Denis, near Paris—Imp. in the manufacture of pipes and tubes, and in the apparatus employed therein.

2767. C. Coates, Sunnyside, near Rawtenstall, Lancashire—Imp. in maundrills for printing.

2769. C. F. Vasserot, 45, Essex-street, Strand—Improved arrangements to be applied to window sashes to prevent draughts and the infiltration of water. (A com.)

Dated 4th December, 1858.

2771. J. Cameron, Glasgow—Imp. in apparatus for the manufacture of sugar.

2773. L. W. Fletcher, Bleaklow, near Bury, Lancashire—Imp. in the construction of electric telegraph cables.

2775. R. Pickering, Lockerbie, Dumfries—Imp. in communicating signals from one part of a railway train to another.

2777. T. Sibley, Ashton-under-Lyne—Imp. in looms for weaving.

2779. J. B. A. Monnier, Nemours (Seine et Marne), France—Imp. in actuating railway brakes.

2781. H. T. Yates, Hounds-gate, Nottingham—Imp. in the manufacture of boards or sheets when wood sawdust is used.

2783. M. Henry, 84, Fleet street—Imp. in weaving and in looms, or apparatus employed therein. (A com.)

2785. J. Platt, Oldham—Imp. in mules for spinning.

Dated 6th December, 1858.

2787. J. Jobson, Derwent Foundry, Derby—Imp. in the manufacture of stoves and fire-places.

2789. B. Nicoll, 40 and 42, Regent-street—Imp. in agricultural machinery for all kinds of crop, chaff, turnip, and other root-cutting, and for the purposes of haymaking, and rubbing corn and seed from the stalks (instead of threshing).

2791. G. Snell, Leeds—Imp. in machinery or apparatus for cutting woollen fabrics.

2793. D. B. White, Newcastle-upon-Tyne—Imp. in indicating gauges.

2795. F. W. Fletcher, Hurdington, near Birmingham—Imp. in bolts for securing doors, and other similar purposes.

Dated 7th December, 1858.

2797. J. E. Boyd, Hither Green, Lewisham—Imp. in the construction of taps, valves, cocks, spiggotts, or other apparatus or instruments for gauging or for drawing off the liquid or fluid contents of any cask, butt, vat, barrel, or other vessels.

2799. C. Williams and W. Ellison, 17, Acton-place, Kingsland-road—A new mode or method of securing and liberating the corks and stoppers of bottles.

2801. W. Madders and J. Waddington, Manchester—Imp. in machinery or apparatus for embroidering woven fabrics.

2803. G. E. Larned, Brooklyn, U.S.—Imp. in the construction and arrangement of the boilers and working parts of steam fire engines, part of which is applicable to engines for other purposes.

2805. J. Haslam and J. Lutener, Preston—Imp. in healds used in looms and dressing frames.

2807. S. W. Pugh, Nelson-square, Commercial-road, New Peckham—Imp. in obtaining and purifying naphtha, paraffine, and other oils, and also spirits.

WEEKLY LIST OF PATENTS SEALED.

[*From Gazette, Dec.* 17, 1858.]

December 17th.

1375. S. Taylor and D. Taylor.
1381. P. B. E. Martin.
1392. Sir J. C. Anderson.
1393. H. H. Henson.
1409. J. A. Rainé.
1474. J. Petrie, jun.
1490. T. Mellod, J. Duxbury, and E. Layfield.
1506. E. Simons.
1728. N. S. Dodge.
1731. W. Hartley.
1919. A. Rottmann.
1928. J. Dredge.
2116. G. M. Levi.
2185. W. Blake.
2313. J. Hick, W. Hargreaves, and R. Harwood.
2318. W. Clay.
2334. W. E. Newton.
2354. J. Baldwin, jun.
2358. J. H. Johnson.
2359. J. Burridge.

[*From Gazette, Dec.* 21, 1858.]

December 21st.

1395. R. A. Brooman.
1411. P. Brown and B. Young.
1415. T. Spencer.
1417. P. J. Livsey and F. L. Stott.
1418. W. Clibran and J. Clibran.
1424. J. Bates, J. York, and W. Parkin.
1426. G. Collier.
1436. J. Maudslay.
1441. W. L. Tizard.
1469. P. P. C. Barratt and J. B. Barrat.
1539. S. Harrison.
1581. R. Burns and J. Rea.
1703. W. E. Newton.
1815. W. E. Newton.
2017. H. J. Distin.
2068. W. H. Manning.
2273. W. Smith.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, Dec.* 17, 1858.]

December 14th.

2861. C. Nickels and J. Hobson.

December 15th.

2844. G. Collier, J. Crossley, and J. W. Crossley.
2925. C. May and E. A. Cowper.
2927. E. A. Cowper.

[*From Gazette, Dec.* 21, 1857.]

December 16th.

2892. M. Tomlinson.
2895. E. Tyer.

December 17th.

2872. J. Hadden, H. Hadden, F. J. Hadden, and C. S. Hadden.
2875. G. Harvey.
166. P. A. le Comte de Fontainemoreau.

December 18th.

2866. E. Davies, J. M. Syers, and C. Humfrey.
2891. B. Hughes.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
4132	Nov. 16.	Base and Tripod for supporting the Centre Pole of a Tent	B. Edgington	2, Duke-street, Southwark.
4133	,, 22.	Feed Roller for Chaff Cutter	Smith and Ashby	Stamford.
4134	,, 30.	Hall's Patent Cartridge Carrier	A. Perry	26, Ann-street, Birmingham.
4135	,, 30.	The Improved Alliance Buckle	W. Aston	Princip-street Works, Birmingham.
4136	,, 30.	Spectacle Side-piece Fastener	F. B. Anderson	56, High-street, Gravesend.
4137	Dec. 1.	Rein Holder	W. Hewitt	Birmingham.
4438	,, 7.	Cap or Cover for a Jar	A. Singer	Vauxhall Pottery, Vauxhall, Lambeth.
4139	,, 9.	Gentlemen's Wardrobe Hat case Portmanteau	E. Wilks	Hanover House, Cheltenham.
4140	,, 13.	The Standing Safety Fireguard	Panklibanon Furnishing Ironmongery Co. (limited)	56, Baker-street.
4141	,, 15.	Rack Pulley	S. Collins	Birmingham.
4142	,, 20.	A Block of Black Lead	G. A. B. Chick	Milk-street, Leek-lane, and Callow Hill street, Bristol.